

**Translation**

**PATENT COOPERATION TREATY**

PCT/JP2004/008804



**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2004P10620WO	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. PCT/JP2004/008804	International filing date (day/month/year) 23 June 2004 (23.06.2004)	Priority date (day/month/year) 25 June 2003 (25.06.2003)
International Patent Classification (IPC) or national classification and IPC C08F 36/06, B60C 1/00, C08F 4/54		
Applicant BRIDGESTONE CORPORATION		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☐ (sent to the applicant and to the International Bureau) a total of \_\_\_\_\_ sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒ Box No. I Basis of the report

☐ Box No. II Priority

☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

☐ Box No. IV Lack of unity of invention

☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

☐ Box No. VI Certain documents cited

☐ Box No. VII Certain defects in the international application

☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 29 March 2005 (29.03.2005)	Date of completion of this report 01 June 2005 (01.06.2005)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/008804

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is language of a translation furnished for the purpose of:

- ☐ international search (under Rules 12.3 and 23.1(b))  
☐ publication of the international application (under Rule 12.4)  
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ The international application as originally filed/furnished

☐ the description:

pages \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ the claims:

pages \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_, as amended (together with any statement) under Article 19

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ the drawings:

pages \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/008804

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	8-16	YES
	Claims	1-7	NO
Inventive step (IS)	Claims		YES
	Claims	1-16	NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

## 2. Citations and explanations (Rule 70.7)

This ISR was prepared based on the following documents D1-D9.

D1: WO, 00/52062, A1      D2: JP, 2002-187908, A      D3: JP, 2001-48940, A  
D4: WO, 02/38635, A1 (& JP, 2004-513998, A)      D5: JP, 2002-256012, A  
D6: JP, 7-188316, A      D7: JP, 55-66903, A      D8: JP, 7-165811, A  
D9: JP, 2000-34320, A

(Regarding claims 1-7)

The inventions of claims 1-7 do not appear to be novel based on documents D1 and D2. Also, they do not appear to involve an inventive step based on documents D3-D5.

Documents D1 and D2 describe a 1, 3-butadiene homopolymer having a number-average molecular weight of 100,000-500,000, cis-1, 4 bonds content of 98.0% or greater, and Mw/Mn of 1.6-2.7.

Documents D1 and D2 do not describe a measurement of a vinyl bond content. However, given the polymer has the high content of cis-1, 4 bonds equivalent to that of the invention of the present application, it is highly possible that the vinyl bond content of such polymer is measured at less than 0.3%.

Also, document D3 describes a 1, 3-butadiene homopolymer having a Mooney Viscosity of 42-120, cis-1, 4 bond content of 99-99.3 mol%, vinyl bond content of 0.3-0.5 mol%, and Mw/Mn of 2.28-3.89.

Documents D4 and D5 describe that in the production of a conjugated diene polymer having a high content of cis-1, 4 bond is produced, a cis-1, 4 bond content can be further enhanced by lowering a polymerization temperature (comparison of document D4 (claims and examples), and document D5 (examples 3 and 4).

The vinyl bond content of document D3 is assumed to be a relatively large value when determined by Fourier transform infrared spectroscopy based on the description in the present application (specification, table 3). In document D3, to further enhance a cis-1, 4 bond content (i.e., lower vinyl bond content), performing polymerization at a lower temperature would be easy for a party skilled in the art.

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of Box V:

(Regarding claims 1-10)

The inventions of claims 1-10 do not appear to involve an inventive step based on documents D4-D7.

Documents D6 and D7 describe producing a high cis polybutadiene by polymerizing a 1, 3-butadiene in the presence of a catalyst containing Lewis acid such as neodymium (branched) carboxylate, dialkyl aluminium hydride, alkyl aluminium chloride or the like.

In documents D6 and D7, to further enhance a cis-1, 4 bond content (i.e., the vinyl bond content will lower), performing polymerization at a lower temperature would be easy for a party skilled in the art.

(Regarding claims 11 and 12)

The inventions of claims 11 and 12 do not appear to involve an inventive step based on documents D4-D9.

Document D8 describes, in a 1, 3-butadiene polymerization catalyst containing neodymium (branched) carboxylate and Lewis acid, further combining aluminium trialkyl, dialkyl aluminium hydride, and/or alminoxane as a catalytic component.

In documents D6 and D7, for performing polymerization at a low temperature as described above, in addition to dialkyl aluminium hydride, using, as a catalytic component, alminoxane recognized as equivalent thereto would be easy.

Also, document D9 describes polymerizing a 1, 3-butadiene using a catalyst comprising neodymium (branched) carboxylate, amoxicillin, organic aluminium compound, and reactant of a metal halide and Lewis base to produce a high cis polybutadiene.

In document D9 as well, performing polymerization at a lower temperature to further enhance a cis-1, 4 bond content (i.e., lower vinyl bond content) would be easy for a party skilled in the art.

(Regarding claims 13-16)

The inventions of claims 13-16 do not appear to involve an inventive step based on documents D1-D9.

Using a high cis polybutadiene as a tire material and in so doing mixing in a suitable amount of a filler are well known to a party skilled in the art. (If necessary, see document D7: page 2, lower left column, lines 1-4.)